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| 09/937,286      | 09/25/2001  | Muradin Abubekirovich Kumakhov | KUMAKHOV-002        | 9535             |

7590 08/13/2003  
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EXAMINER

HO, ALLEN C

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2882

DATE MAILED: 08/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/937,286

Applicant(s)

KUMAKHOV, MURADIN  
ABUBEKIROVICH

Examiner

Allen C. Ho

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 July 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 20-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28-30 is/are allowed.
- 6) ☒ Claim(s) 20-27 and 31-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Specification*

1. The abstract of the disclosure is objected to because it exceeds 150 words. Correction is required. See MPEP § 608.01(b).

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 20 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Grodzins *et al.* (U. S. Patent No. 5,696,806).

With regard to claim 20, Grodzins *et al.* disclosed a method for producing the image of the internal structure of an object (3) with x-rays (2), where the object is subjected to x-rays and the output from one or more x-ray detectors (18, 20, 42, 43) is used for obtaining data on the

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substance density of the object (column 1, lines 26-29); wherein x-rays concentration (36) is done in a zone located within a target area (surface area facing the pencil beam) of the object and covering the current point (a voxel), to which the measurement results are attributed; the secondary radiation (Compton-scattered radiation) excited in this zone is transported (15, 16, 44, 45) to one or more detectors (18, 20, 42, 43); the target area of the object is scanned by moving the zone (column 3, lines 16-32); judgment on the substance density of an object in the current point is made based on the population of intensity values of the secondary radiation, which are obtained with the help of one or more detectors and which are determined concurrently with coordinates (voxel coordinates, see Fig. 2) of the current point within the x-rays concentration zone, to which the measurement results are attributed; and the above density values are used together with respective coordinate values to build up a density distribution picture (three-dimensional tomographic image) for the target area of the object.

With regard to claim 21, Grodzins *et al.* disclosed a method according to claim 20, wherein the x-rays concentration is done with the help of one or more collimators (36) using a respective number of space-apart x-ray source (33); excited secondary radiation is transported to one or more detectors (18, 20, 42, 43) with the help of one or more collimators (15, 16, 44, 45), and all collimators are oriented so that the axes of their central channels would cross in the current point (voxel), to which the measurement results are attributed.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grodzins *et al.* (U. S. Patent No. 5,696,806) as applied to claim 20 above, and further in view of Yan *et al.* (U. S. Patent No. 5,812,631).

With regard to claim 22-26, Grodzins *et al.* disclosed a method according to claim 20, wherein the x-rays concentration is done with the help of one or more collimators (36), and excited secondary radiation is transported to one or more detectors (18, 20, 42, 43) with the help of one or more collimators (15, 16, 44, 45).

However, Grodzins *et al.* did not teach using various x-ray optics (half lens, collimator with channels, etc.) for focusing, collimating, and collecting x-rays.

Yan *et al.* disclosed various x-ray optics, including half lens (Fig. 4) and collimator with channels (Figs. 2 and 5), for focusing, collimating, and collecting x-rays.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to replace the collimators with various x-ray optics for focusing and collecting x-rays, since a person would be motivated to choose from among the known equivalents based solely on design choice absent any showing of criticality. The lack of criticality is demonstrated by applicant's claiming of a plurality of equivalent arrangements for focusing, collimating, and collecting x-rays.

7. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grodzins *et al.* (U. S. Patent No. 5,696,806) in view of Vogeley, Jr. (U. S. Patent No. 5,585,603).

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With regard to claim 27, Grodzins *et al.* disclosed a device for producing an image of the internal structure of an object (3) with x-rays, comprising: a means (conveyor) for positioning the object under study; an x-ray optical system, wherein the x-ray optical system contains one (1) or more (33) x-ray sources and an x-rays concentration means (36) for concentration of radiation from the one or more x-ray sources in the zone located inside the target area (surface area facing the pencil beam) of the object and covering the current point (a voxel), to which the measurement results are attributed; a means (column 3, lines 16-32) for relative movement of the means for positioning the object under study versus the x-ray optical system; a means for data processing and imaging (inherent, for generating a tomographic image); one or more means (15, 16, 44, 45) for transportation of excited secondary radiation (Compton scattered radiation) and mounted close to their exit x-rays detectors (18, 20, 42, 43) for the secondary radiation, where the output from these detectors is connected to the means for data processing and imaging (inherent).

However, Grodzins *et al.* did not teach that the means for positioning of the object under study and the x-ray optical system are connected to sensors designed for determining the coordinates of the current point, to which the measurement results are attributed, and those sensors are connected through their outlets to the means for data processing and imaging.

Vogeley, Jr. disclosed a position sensor (18) for determining the coordinates of each pixel of an object under study, the position sensor is connected to a computer (26) for data processing and imaging.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide position sensors for determining the coordinates of the point,

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since a person would be motivated to associate the output from each detector with a coordinate in order to create a tomographic image.

8. Claims 31-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grodzins *et al.* (U. S. Patent No. 5,696,806) and Vogeley, Jr. (U. S. Patent No. 5,585,603) as applied to claim 27 above, and further in view of Yan *et al.* (U. S. Patent No. 5,812,631).

With regard to claims 31-38, Grodzins *et al.* and Vogeley, Jr. disclosed a device according to claim 27, wherein the x-ray optical system contains one (1) or more (33) x-ray sources and an x-rays concentration means (36) for concentration of radiation from the one or more x-ray sources in the zone located in side the target area (surface area) of the object and covering the current point (a voxel), and one or more means (15, 16, 44, 45) for transportation of excited secondary radiation (Compton scattered radiation) and mounted close to their exit x-rays detectors (18, 20, 42, 43) for the secondary radiation.

However, Grodzins *et al.* did not teach using various x-ray optics (half lens, collimator with channels, etc.) for focusing, collimating, and collecting x-rays.

Yan *et al.* disclosed various x-ray optics, including half lens (Fig. 4) and collimator with channels (Figs. 2 and 5), for focusing, collimating, and collecting x-rays.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to replace the collimators with various x-ray optics for focusing and collecting x-rays, since a person would be motivated to choose from among the known equivalents based solely on design choice absent any showing of criticality. The lack of criticality is demonstrated by applicant's claiming of a plurality of equivalent arrangements for focusing, collimating, and collecting x-rays.

***Allowable Subject Matter***

9. Claims 28-30 are allowed.
10. The following is an examiner's statement of reasons for allowance:

With regard to claims 28-30, although the prior art discloses devices for producing an image of the internal structure of an object with x-rays comprising an x-ray optical system, wherein the x-ray optical system contains an x-ray source and an x-rays concentration means for concentration of radiation from the x-ray source in the zone located inside the target area (surface area) of the object and covering the current point (a voxel), and one or more means for transportation (collimators) of excited secondary radiation (Compton scattered radiation) and mounted close to their exit x-rays detectors for the secondary radiation, it fails to teach or fairly suggest that the x-ray optical system contains a plurality of x-ray sources, each of the x-rays concentration means designed for concentration of radiation from the sources, each of the means for transportation of the secondary radiation excited in the zone to detectors, having its channels oriented towards to above x-ray concentration zone, and the optical axes of the central channels of all collimators cross in the current point, to which the measurement results are attributed.

***Response to Arguments***

11. Applicant's arguments filed 02 July 2003 have been fully considered but they are not persuasive.

The applicant argues that Grodzins *et al.* failed to provide a means for concentration of radiation. The examiner respectfully disagrees. Grodzins *et al.* clearly taught that concentration



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of x-rays is done by a collimator (36) because the x-rays emitted by a point source are confined to a pencil beam (35). Furthermore, applicant disclosed that a hemilens (21), which functions as a collimator for a point source, could be used as a means for concentration (Fig. 4).

To further clarify examiner's position, the examiner would like to point out that the teachings of Grodzins *et al.* read on the following claim limitation: x-rays concentration (36) is done in a zone located within a target area (surface area facing the pencil beam) of the object and covering the current point (a voxel), to which the measurement results are attributed. The only difference between applicant's invention and the invention of Grodzins *et al.* seems to be that applicant's invention measures one point at a time, whereas Grodzins *et al.* taught measuring multiple points simultaneously.

### ***Conclusion***

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (703) 308-6189. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (703) 308-4858. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Allen C. Ho  
Patent Examiner  
Art Unit 2882

ACH  
August 6, 2003

  
EDWARD J. GLICK  
Supervising Patent Examiner  
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